

Pilot location: Centrum, Rotterdam, NL

Location and Environmental Setting

The district Centrum is one of the 42 sewer district of Rotterdam City, located in the central part of the city (see Figure 1). The sewer system is combined. The upper boundary of the district is delimited by the train line and the central station, next to which the X-band radar will be installed. It includes mainly residential areas where approximately 30,000 people live and 2 green areas located in the Southern part of the district, called "Het Park" (24 ha) and "Museumpark" (6 ha). The southern border of the district is formed by one of the Maas river meanders (see Figure 1 and 2).

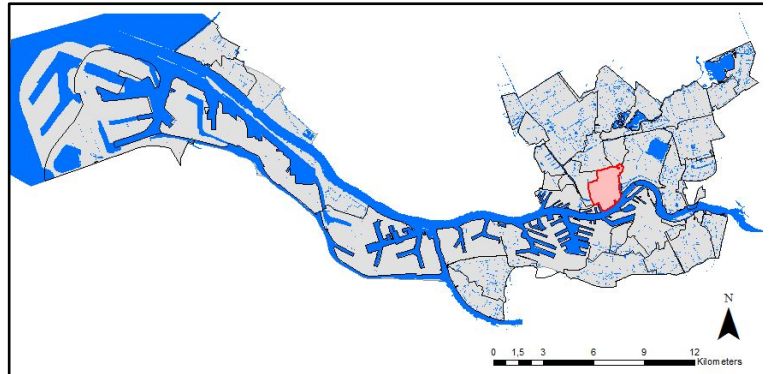


Figure 1: General location of the Centrum catchment

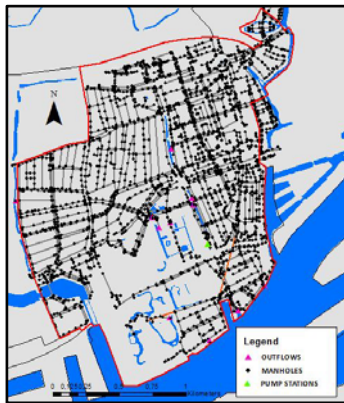


Figure 2: Map of the sewer system of the Centrum catchment

The district belongs to a polder area, i.e. below sea level. For this reason, during heavy rainfall, excess storm water needs to be pumped out in the river system or temporally stored. For that purpose, under the Museumpark an underground storage facility has been built by Rotterdam City, to reduce flooding risk in the district during heavy rainfall. It has a capacity of 10,000 m³.



Figure 3: photos of the Centrum catchment

Urban pluvial flood risk problems and management objectives

Past flood problems

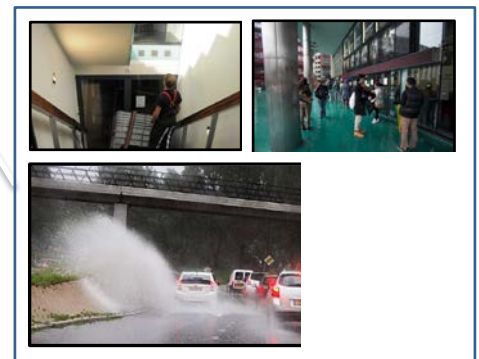
3rd May 2012: heavy rain occurred during the night and caused flooding on Van Vollenhovenstraat (water on the street and flooded basements), in the Southern part of the district. This pluvial flood was partly caused by failure of the sewer system.

28th December 2003: Many reports of flooding on Koningin Emmaplein, in the Southern part of the district; water in basements and houses due to intense rain. Approximately 50 households and commercial buildings were affected.



Figure 3: Areas affected by the flood in the past.

11th June 2012: in a short time 30 mm of rainfall fell on the city, overloading the sewer system. Several basements flooded, among which a theatre and a cinema in the North-Eastern part of the district. Approximately 15 centimetres of water covered some streets, affecting 30 residential and commercial properties.



Flooding mechanisms and urban pluvial flood risk mitigation options (aiming at reducing flow peaks during extreme rainfall events):

Under the RAINGAIN project different scenarios will be analysed in order to identify flood prone locations and find solutions to reduce flood risk. The flooding mechanism affecting this area has pluvial origin: the area is highly urbanised, thus the runoff response to rainfall is faster than other type of surfaces. Surface runoff resulting from heavy rainfall generally flows directly and very quickly into the sewer system, causing sewer surcharge. A powerful solution has been set up in this district: an underground water storm tank (green rectangle in Figure 3) has been built to avoid storm water directly draining into the sewer network. It delays the runoff and thus prevents the sewer from overloading. This solution, together with others (i.e., the optimization of the operational pumping system), will be analysed within the modelled scenarios to provide an alternative water system management to cope with flood risk.